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PROGRESS REPORT OPERABLE UNIT 4 SILOS 1-4 JULY 1992

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FACT SHEET

Fernald Project

Remedial Investigation/ Feasibility Study

PROGRESS REPORT JULY 1992

Operable Unit 4
SILOS 1-4

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Introduction

The Remedial Investigation/Feasibility Study is the blueprint for cleanup at the U.S. Department of Energy's Fernald Environmental Management Project (FEMP). The nature and extent of contamination at the FEMP and surrounding areas is being thoroughly investigated so that appropriate remedial actions can be formulated and implemented.

The FEMP has been divided into five sections, known as Operable Units, for environmental investigation and cleanup. The Operable Units were defined based on their location or the potential for similar technologies to be used in the ultimate cleanup.

During the course of the RI/FS effort, certain conditions are occasionally identified which call for more immediate action. These actions are called "Removal Actions" and are initiated when there is a need to accelerate cleanup activities to address releases or potential releases of hazardous substances. Removal Actions are coordinated with the U.S. EPA and the Ohio EPA.

Following is a progress report on Operable Unit 4 including its history, the current status of RI/FS activities, cleanup alternatives under consideration, and work that is being done to alleviate near-term concerns.

Background

K-65 Silos 1 and 2 contain radium-bearing radioactive wastes dating back to the late 1940s. The two K-65 silos were constructed in the early 1950s and were reinforced with an earthen berm in 1963. The berm was upgraded in 1983. Other past improvements included a 30-foot cap which was installed on top of the silo domes for added protection, and a polyurethane foam coating that was applied over the domes for weather protection. A Radon Treatment System (RTS) was constructed, and radon gas monitors were installed around the FEMP boundary and in the immediate vicinity of Silos 1 and 2. Silo 3 contains dried uranium-bearing metal oxide waste, and Silo 4 is empty.

RI/FS Activities

K-65 Vertical (Berm) Borings: Samples were collected from four vertical borings into the earthen berm surrounding the K-65 silos for the purpose of determining whether measurable quantities of residual materials have leaked through the walls of the silos into the surrounding berms. Results were received from the independent laboratory and validation of these results is complete. Evaluation of the validated analytical data is in progress. This information is required to support the completion of the Remedial Investigation and Feasibility Study reports for Operable Unit 4.

K-65 Low-Angle (Slant) Borings: Soil samples were collected from five borings advanced beneath the K-65 silos to determine whether residual materials may have migrated from the tanks or the associated underdrain system into the underlying soils or perched groundwater. Perched groundwater was encountered in each of the five borings and samples were taken of the groundwater. Preliminary sample analyses from the on-site laboratory indicates the presence of low concentrations of radionuclides in the soils and perched water underlying the silos. Preliminary sample analyses results have been received from the off-site independent laboratory, which conducted full chemical and radiological analyses. Validation of these results is complete. Evaluation of the validated analytical data is in progress. This information is required to support the completion of the Remedial Investigation and Feasibility Study reports for Operable Unit 4.

Resampling of K-65 Residues: Analyses of samples taken from residue material in K-65 Silos 1 and 2 have been completed by an independent laboratory. The data was compiled by the laboratory and transmitted to the FEMP and validation of analytical results is complete. This information is being used to establish the physical, chemical, and radiological characteristics of the waste materials for purposes of determining appropriate treatment methods for K-65 contents.

Reports: Two treatability study work plans have been completed to support Operable Unit 4 activities. A Treatability Work Plan has been approved by the U.S. EPA for the evaluation of solidification and chemical extraction technology for Operable Unit 4 wastes. This Treatability Work Plan describes a five-stage process for evaluating the applicability of these technologies. The solidification study being conducted under this work plan involves the evaluation of different cement and additives, focused on producing the best mix design which retards contaminant migration and provides acceptable physical properties such as weight and strength.

The chemical extraction portion of the study is focused specifically on the potential for removing certain radionuclides and heavy metals from the K-65 residues through acid/solvent digestion and extraction techniques. The purpose of this portion of the study is to examine the feasibility of removing certain contaminants of concern to levels which would reduce the volume requiring eventual disposal, or reduce the design requirements for the ultimate disposal facility. Studies being conducted under this plan at the IT Environmental Technology Development Center are expected to be completed in September 1992.

Another Operable Unit 4 Treatability Study Work Plan examining vitrification has been approved by the U.S. EPA. This plan specifically examines the technical feasibility of removing the waste materials from Silos 1, 2, and 3 and transforming them to glass in a high-temperature furnace. Samples of materials in the silos have been transferred to the DOE Pacific Northwest Laboratory in Richland, Washington, to perform the tests. Results from this study are expected in September 1992.

These technologies are being tested to provide valuable information to support the determination of which technology provides the most environmentally-sound, cost effective and implementable method for treating the wastes prior to final disposal. The compilation of other Operable Unit 4 RI/FS reports, including the Remedial Investigation Report and the Feasibility Study Report, are proceeding consistent with the schedules set forth in the 1991 Amended Consent Agreement.

Removal Actions

K-65 Decant Sump Tank (Removal Action No. 5): Sample analysis results have been received from the independent laboratory and the FEMP laboratory. Samples of liquid removed from the K-65 Decant Sump Tank, and sludge removed from the base of the tank, were analyzed and characterized to determine proper treatment and final disposition. Removal of this liquid from the underground sump tank reduces the potential for leakage of contaminants into surrounding soils. This Removal Action was completed in April 1991, when approximately 8,000 gallons of contaminated water was pumped from the K-65 Decant Sump Tank. The removed water was stored in above-ground tanks in Plant 2/3. Treatment of the liquid was completed in May 1992. The K-65 Decant Sump Tank was used to collect and store liquid that drained from the K-65 silos as the slurried material settled.

Silos 1 and 2 (Removal Action No. 4): This Removal Action was completed with the installation of bentonite clay over radium-bearing radioactive waste material in the K-65 silos.

Covering the silo contents with a layer of bentonite clay accomplished two key objectives. It substantially reduces the accumulation of radon in the silo headspace—between the surface of the residues and the dome—thereby reducing radon emissions to the environment. Secondly, it provides protection from potential releases to the environment in the event of a silo dome collapse.

The effectiveness of this Removal Action is determined by comparing the concentration of radon in the silo headspace before and after the placement of bentonite. Such a comparison indicates the bentonite has resulted in more than a 90 percent reduction of radon accumulation in the silo headspace.

Expedited Silo 3 (Removal Action No. 21): This Removal Action was completed in January 1992, with the removal of an out-of-service dust collector and hopper assembly from the dome of Silo 3, eliminating the potential for release of radioactive material to the environment. All pathways were permanently sealed to prevent the release of silo contents to the atmosphere. Disposition of the dried uranium-bearing metal oxides in Silo 3 is being addressed under the Operable Unit 4 RI/FS.

Cleanup Alternatives

Several cleanup alternatives have been identified for Operable Unit 4, involving a combination of technologies currently being assessed as part of the RI/FS for the silos. The alternatives include: 1) stabilizing and capping the waste in place; 2) removing and stabilizing/treating the waste with disposal in an engineered facility on FEMP property, and 3) removing and stabilizing/treating the waste and shipping it to an approved off-site disposal facility.

More information about Operable Unit 4 is available in the Public Environmental Information Center (PEIC), where Fernald Environmental Management Project cleanup documents are kept in the Administrative Record. The PEIC is located in the JAMTEK building, 10845 Hamilton-Cleves Highway, Harrison, Ohio, 45030. The telephone number is (513) 738-0164.